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Trans-Organisational Knowledge:

The 4I Framework Revisited

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Trans-Organisational Knowledge: The 4I Framework Revisited

Summary

In this paper we look at the '4I framework' introduced by Crossan, Lane, & White in the context of social learning, i.e. learning understood as fundamentally identity-based and negotiated in human interactions. Reviewing literature from the broadly understood area of knowledge and learning in organisations, we suggest that the 4I framework in its current form does not account for knowledge sharing taking place in social learning spaces, such as communities of practice. The reason for this anomaly is that knowledge sharing in such networks does not respect organisational boundaries. Having synthesized this literature, we suggest augmenting the 4I framework by adding a new level of analysis: the *trans-organisational* level. At this level the typical process of the 4I framework change, interpretation becomes reinterpretation, integration becomes dis- and reintegration and institutionalisation becomes deinstitutionalisation.

Word count: 6,000

Introduction

The aim of this paper is to look at the '4I framework' originally introduced by Crossan, Lane, & White in the context of social learning, i.e. learning understood as fundamentally identity-based and negotiated in social interactions. We focus specifically on the 4I framework as it is a widely recognised model of Organisational Learning (OL) which also serves us as a point of reference for discussing the relationship between OL and the social perspective on learning. Based on its popularity and widespread usage, it could be assumed that such an influential model should be able to account for learning that occurs within and across informal networks and communities of practitioners. Reviewing literature from the broadly understood area of knowledge and learning in organisations including personal knowledge, organizational knowledge, organizational learning, sensemaking, and communities of practice, we suggest that this is not the case, as knowledge and learning in such networks does not respect organizational boundaries. Having synthesized this literature, we suggest augmenting the 4I framework by adding a new level of analysis: the *trans-organisational* level.

The 4I framework remains perhaps the most widely used model illustrating the strategic renewal of a firm through learning. The framework was originally intended as a step "towards a theory" that could contribute to systemising OL (Crossan et al., 2011: 446), the field where the concepts and the terminology were seen as fragmented and inconsistent (Vera and Crossan, 2004). Indeed, the 4I framework's simplicity and its unifying power have been deemed valuable in clarifying OL and in connecting its various elements together (Mintzberg et al., 1998), even though the framework itself has never been accepted as a theory (Crossan et al., 2011). In matter of fact, an integrative theory may not be even feasible in social sciences, and we should rather seek to uncover how the various theories can 'plug in' to each other. Furthermore, even if "the products of the theorizing process" are not full blown theories, they can still serve as a useful tool – an approximation that can lead to further development (Weick, 1995b: 385-386). Similarly, Crossan, Maurer, & White (2011: 451) argue:

"(...) we consider OL theory to be like a tree, with a trunk and then major branches from which thousands of leaves may flourish. There have been a lot of leaves placed on branches, and to some degree new branches added to the tree, but little, if any, work has been done to establish a strong foundation or theory - the trunk."

It can be suggested that if the 4I framework is supposed to serve the role of fortifying the 'trunk' of the 'OL-tree', then it may be beneficial to advance this model by strengthening its focus on the inherently social 'situated learning' (Lave and Wenger, 1991) which Weick (1995a: xi) regards "a valid portrait of learning". This in turn leads us to the concept of Communities of Practice (CoPs) which undeniably 'made a career' (Wenger, 2010a) since it was founded (Lave and Wenger, 1991) on the roots of the social learning theory (Lave, 1988, Vygotsky, 1978, Bourdieu, 1990). In this paper CoPs will be referred to as exemplars of "social learning spaces", i.e. social spaces where people share knowledge (Wenger, 2009: 18-19). It must be emphasised that *knowledge sharing* here is not just a classy word for transferring information to another person, and will not be treated as a synonym for *knowledge transfer* or *knowledge exchange*. Knowledge sharing is about "thinking together", and hence it requires committed human relationships and an ability to collectively address the problems that matter to everyone actively involved (McDermott, 2000: 2-3, Velencei et al., 2009, Lee et al., 2010, Von Krogh, 2011).

The argument will commence by providing a detailed introduction to the 4I framework. Afterwards the characteristics of social learning and different types of social learning spaces will be discussed, and CoPs will be described as being both networks and communities at once. Subsequently learning in CoPs will be portrayed as "sticking" to the practice and "leaking" through the official organisational boundaries by the means of knowledge-based human networks (Brown and Duguid, 2001: 199). Lastly it will be examined, with reference to the reviewed literature, whether the 4I framework is sufficiently harmonious with social learning spaces, and potential amendments to the framework will be suggested which may perhaps improve that fit – or at least encourage further discussion about this influential model in the context of social learning.

The 4I framework

Central to the 4I framework are four learning processes occurring at three different levels of analysis, namely individual, group, organisational (Figure 1). The processes at the individual level are called "intuiting" (preverbal experiencing of patterns and images) and "interpreting" (articulating insights and constructing cognitive maps). At the group level people still interpret, but apart from that they also "integrate" their learning (i.e. enact shared meanings and coordinate their actions). Lastly, integrating extends to the organisational level where knowledge from the preceding levels becomes "institutionalised" in the form of organisational context, such as scripts and formal rules (Crossan et al., 1999: 524-530). More recently Akinci & Sadler-Smith (2012: 9-11) suggested extending the framework by "initiating" process of "the external and/or internal circumstances which set the context for the decision (…) [and] act as a trigger and drive the decision", and also by complimenting the intuiting process with 'analysing' as occurring in parallel at the individual level.

The inputs and the outputs of the processes in the 4I framework are the "learning stocks" corresponding to the respective levels of analysis. When knowledge is shared across individual and group knowledge stocks to the organisational knowledge stock then the "feed-forward learning" flow occurs with the prospect of updating the organisational context. Conversely when the knowledge is shared in the opposite direction (i.e. from organisation to groups and individuals) then the "feedback learning" flows come in place, adding to the development of routines, rules and patterns, and spreading them across the organisation (Bontis et al., 2002: 440-441, 445).

Level of analysis	Learning process(es)
Individual	intuiting, interpreting
Group	interpreting, integrating
Organisational	institutionalising

Based on Crossan et al. (1999)

Figure 1: Levels of analysis and the learning processes in the 4I framework

Nonetheless it must be noted that the feed-forward and feedback learning flows should not be understood as equivalent to exploring and exploiting of knowledge respectively (March, 1991), as it was originally stated in Crossan et al. (1999: 524) and Crossan & Berdrow (2003: 1090). What essentially distinguishes learning from being exploratory or exploitative is whether it challenges or reinforces the organisational institutionalisation. In such view both exploration and exploitation of knowledge can occur either as part of feed-forward or feedback learning flows (Jansen et al., 2009). In effect the various stocks of knowledge and the flows of learning which bind them together represent a dynamic knowledge system where learning is in the state of constant flux.

Social learning spaces

From the perspective of social learning, which is compatible with Polanyi's work on personal knowledge, people in organisational knowledge systems (Figure 2) own their knowledge which is unique and inseparable from the knower (cf Tsoukas, 2005a, Polanyi, 1962, Wenger, 1998). Knowledge is personal because it requires personal participation of the knowers who inevitably know more than what they are able to put into words (Polányi, 1966b). As a result, their tacit knowledge cannot be simply converted into an explicit form (Tsoukas and Vladimirou, 2005: 119) – in Polanyi's own words: "a *wholly* explicit knowledge is unthinkable" (Polányi, 1966a: 7). This helps explaining why the first codification-oriented knowledge management projects have by large failed, and instead it has been increasingly talked about building environments where practitioners could effectively learn from each other (Davenport and Prusak, 2000, Sveiby, 2007, Adler et al., 2011).

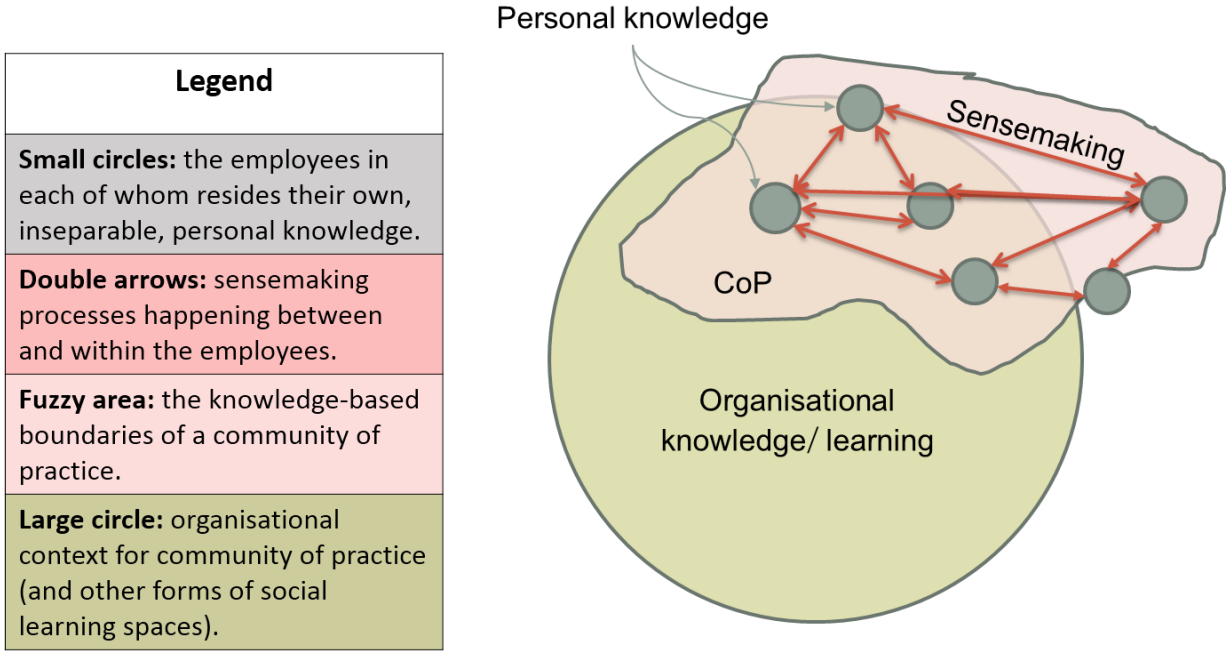


Figure 2: Social learning in organisational context

Knowledge workers subscribe to various social practices (e.g. dentistry, physiotherapy) – social because they are developed by wider communities of practitioners and not just by one person (Polanyi, 1946, Tsoukas, 2005b, Gherardi et al., 1998). Each practitioner may then belong to a different lore: a multigenerational knowledge tradition that is only alive in a

collective of people, and which is guided by its masters, i.e. most seasoned professionals (Polanyi, 1962, Weick, 1995a). Learning here means identifying oneself with the relevant topics within a social practice, and continuously negotiating their meanings with other practitioners (Gherardi, 2009, Lave and Wenger, 1991). Moreover, joining a lore leads to the exclusion from other lores – some of which we have already experienced, and some of which we will no longer have sufficient time and/or opportunity to explore (Wenger, 1998). Consequently social learning is also very much about unlearning (Weick, 1996), for it often requires the readiness to abandon the learning of yesterday and to adopt the tradition of newly discovered communities which one wishes to engage with (Wenger, 1998).

People who identify themselves with the same knowledge traditions tend to make more sense of their learning interactions because they care about the similar topics and they share their lives as practitioners (Wenger, 2011). By participating together and by "dwelling in" each other's practices, their gradually master the art of "interiorising" the relevant tools of that domain as if they were 'parts of their body' (Polányi, 1966b: 30). They witness and tell the same stories (Brown et al., 2004, Sveiby and Skuthorpe, 2006) "*about everything that matters to those participating in the practice"* (Tsoukas, 2005b: 82). Furthermore, they are able to pay attention to similar "cues" of their present experience for they know how to name them, and they produce joint meanings by linking those cues to the "frames" from the past which at some point they have experienced and interiorised together. When practitioners "enact" and share mental models of their social world this way, i.e. they mutually act upon them (Weick, 1995a: 49, 109-11, Weick et al., 2005), over time they construct knowledge-based boundaries signifying that "serious learning is taking place", so outsiders should keep out (Wenger, 1998: 253-254).

We can now see that informal (or formal but self-governed) communities emerge as a result of peoples' mutual engagement around their day-to-day learning. The presence of such practice-oriented communities may mean that people act as active conveners of knowledge (or rather knowing) in various critical knowledge areas (e.g. when nurses in a ward try to critically and collectively evaluate the best possible ways of performing their work) (Orlikowski, 2002, Brown and Duguid, 1991). At the same time we agree with other authors that such communities are "neither a haven of togetherness nor an island of intimacy insulated from political and social relations" (Contu, 2013, Mørk et al., 2010, Wenger, 1998: 77). Nonetheless, through the interplay of participation (i.e. experiencing the world together) and reification (giving substance to these experiences) CoP members continually (re-)negotiate the issue of 'this is how we do things around here' (Wenger, 1998), then within well-functioning communities members can potentially undertake constructive and multilateral inquiries into the real-life problems of the organisation (also known as "good dialectics"). In other words, membership in productive communities organised around social practices may be an opportunity for people to develop their ability for acting as agents of OL through single-loop, double-loop, and deutro-learning that "meet standards of high quality inquiry" (Argyris and Schön, 1978: 42). However, whether this happens or not also depends on the extent to which an organisation is a knowledge-oriented, learning organisation (Argyris and Schön, 1996) encouraging employees to share knowledge and to thereby co-produce various types of social learning spaces.

What *is* a social learning space is where people engage in committed and mutual learning interactions. What *is not* a social learning space is where knowledge is predominantly passed one-way (e.g. often in classrooms), or when it is reified as tangible informational materials – however, both of these examples can potentially lead to the development of social learning

spaces (Wenger, 2009). Furthermore, characteristic to all social learning spaces is that they require sufficient amount of people's knowledge, trust, time, commitment, and some shared situations and interests with which they can identify themselves (Levin et al., 2004).

In this paper we distinguish between four types of social learning spaces (Figure 3). The least intensive form of a social learning space is a *good conversation* as it can be just a one-off interaction (Wenger, 2009: 18). An example of a good conversation is when two attendees in a conference start to talk about a presentation which they have just seen and they enjoy talking about it so much that they lose the sense of time. If people want to continue their conversations and thereby give them some history, they may start to identify each other as *learning partners* who regularly learn together and from each other (Wenger and Underhill, 2009, Wenger-Trayner and Wenger-Trayner, 2011a). When a group of learning partners join to open a shared public space for their learning, and they treat it as a natural forum for negotiating their practices, then we can call it a *Community of Practice* (Wenger, 2010a). An example of a Community of Practice (CoP) can be a club of wine tasters who meet every Tuesday evening to talk about their ways of doing things, negotiate what it means to be a wine taster, live with their own stories, interact with people who hold stake in their community (e.g. restaurateurs, chefs) and train newcomers who wish to become full members one day (Wenger, 2011, Lave and Wenger, 1991).

Based on Wenger (2009)

Figure 3: Types of social learning spaces.

Lastly, the most intensive forms of social learning spaces are the *Hot Spots*, which can be understood as moments where people collaborate and innovate particularly well and which regularly lead to excellent ideas, i.e. ideas that are surprisingly good, new, and which further on lead to breakthroughs (Gratton, 2007). If we thought of those moments in terms of adding to them more structure (Thompson, 2005), we would also be able to conceptualize them as highly performing CoPs in which knowledgeable practitioners work very closely together, and pool resources in the atmosphere of kinship (Polanyi, 1962). Dörfler and Eden (2011: 28-

30) give an example of a Hot Spot by referring to Arthur Kornberg (Nobel Prize in Physiology or Medicine, 1959) who set up a biochemistry workshop where not only did he train new apprentices, but he also managed to promote shared values and high levels of trust and openness which were then inherited by the following generations of scientists. As a result Kornberg and the other core members of the workshop (including Paul Berg – Nobel Prize in Chemistry, 1980) "stayed together as a cohesive unit for forty years until retirement" (Berg, 2004, Kornberg, 2005). To illustrate this point a photograph is included on Figure 3 in which Berg is serving ice cream to the other members of the lab in a social event. Despite the fact that most researchers would pursue their own individual projects they all remained close friends and regularly shared their knowledge, contributing to establishing what arguably became "the best biochemistry lab in the world"(Dörfler and Eden, 2011: 28-30). It is beyond the scope of this work to consider when, how, and under what conditions CoPs may become Hot Spots (and clearly the great majority of CoPs do not need to and will never achieve this). It should therefore suffice to treat here Hot Spots as 'metaphorical idols' for social learning spaces: the often unachievable ideal of how to foster particularly productive social learning and the sense of fraternity between practitioners.

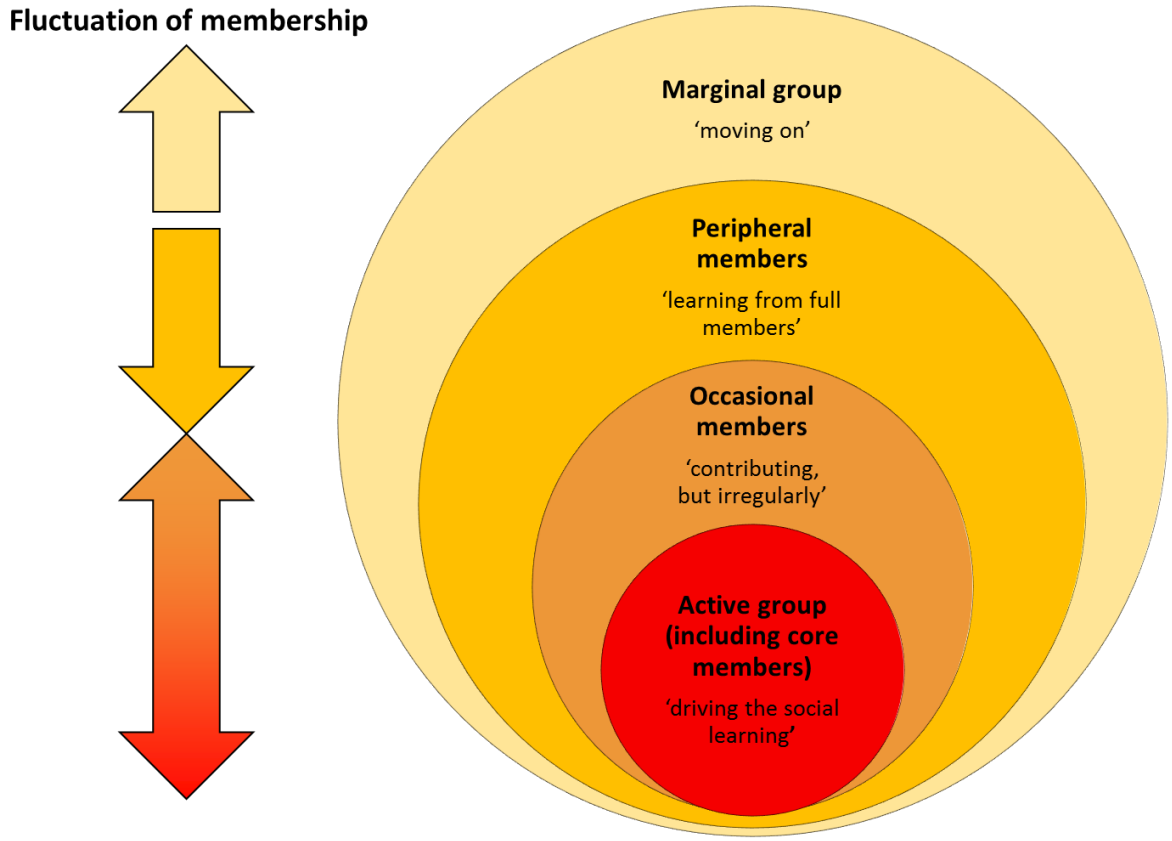
Degrees of membership in communities of practice

Communities of Practice (CoP) have been introduced as groups of people who identify each other as learning partners and who regularly take part in knowledge sharing. This way they create their own "histories of learning" and they collectively develop their practice over time (Wenger, 1998: 87). For this reason CoPs can potentially be "quintessential examples of social learning spaces" (Wenger, 2009: 18-19) and therefore they will be placed in the centre of this argument.

CoPs are usually brought to life by small numbers of leaders who invest their energy in maintaining regular mutual interactions in relation to the selected topics of shared interest. Those leaders may or may not be explicitly aware of their 'social artistry' i.e. leadership work of inspiring others to learning together and from each other (Wenger, 2009: 26-27). Nevertheless, they become *core members* within the community's most *active group* (Figure 4), i.e. participating practitioners in the relevant field of the emerging community (Wenger et al., 2002: 57). The active group's distinguishing type of learning is knowledge sharing, already described here as 'thinking together', i.e. the deep and committed mutual learning process which requires sufficient understanding of the respective knowledge domain on behalf of all the involved parties (Figure 5).

We can observe knowledge sharing when for example a number of medical doctors discuss a particularly difficult case, and they jointly evaluate and negotiate which knowledge from their own memories is relevant for the needs of the present moment (Tsoukas, 2005b). Notably, this way new knowledge can be constructed as the practitioners make an effort together to synthesise what they individually know (Velencei et al., 2009). This may explain why CoPs are believed to be so important in developing the most dynamic social practices that are crucial to the prosperity of organisations (Liedtka, 1999). It must be also emphasised that knowledge sharing, just as knowledge work, cannot be externally controlled and directed (Lambe, 2008, Davenport, 2005), because it is elusive, unpredictable, and only the specialists really know what their job is. Nobody knows the future course of a social practice, even the practitioners themselves (Wenger, 2004). Likewise no one owns a community, just as Handy

(Handy and Fisher, 2003: 1) says: "Nobody owns a village. You are a member and you have rights."



Based on Wenger et al. (2002: 57).

Figure 4: Layers of membership in communities of practice.

	CoP layer	Characteristic form of social learning
	Peripheral	Knowledge exchange/ knowledge transfer "Picking up useful knowledge"
	Occasional	Knowledge sharing / knowledge exchange "Exchanging insights"
	Active/Core	Knowledge sharing "Thinking together"

Based on McDermott (2000: 2-3), Velencei et al. (2009: 203-205), Wenger et al. (2002: 57).

Figure 5: Characteristic forms of social learning.

Due to its committed and mutual nature, knowledge sharing at the core of CoPs amplifies the first two previously introduced types of social learning spaces: 'good conversations' and particularly the more stable 'learning partnerships' (Figure 3). However, in order to provide a CoP with good balance of variety and richness, the core group must also invite 'lighter' degrees of membership (Figure 4) – without them the experience of engaging in learning may be too limiting, and peoples' excitement may exhaust too soon (Wenger et al., 2002: 55-58). Furthermore, since knowledge sharing is very intensive, it is also demanding, e.g. in competence, time, trust, shared values (Levin et al., 2004), and hence the core group is usually limited in numbers. However, not only is it unfeasible, but also unnecessary to expect that all members in a CoP are engaged and that they actively participate in knowledge sharing (Wenger et al., 2002). By referring again to the model of different types of social learning spaces (Figure 3), what differentiates CoPs from 'mere' learning partnership, is the presence of typically more numerous "occasional" and "peripheral" members (Wenger et al., 2002: 55-58, Wenger-Trayner and Wenger-Trayner, 2011c). In other words, a CoP can be seen as the first social learning space by the magnitude of intensity where knowledge sharing is no longer the only major type of learning, but it still provides the social learning space with its basic substance.

The less dedicated and not as frequent participation brings less intense learning (Figure 4 and Figure 5). Occasional members, as their name suggests, will only sometimes engage with other members of a community (Wenger-Trayner and Wenger-Trayner, 2011c). While they may, of course, sometimes actively contribute to knowledge sharing, it is more likely that they will rather get involved in *knowledge exchange,* i.e. passing on knowledge in two directions, such as in a simple exchange of facts (Velencei et al., 2009: 203-205), but without deeply 'thinking together' about relevant problems. This is because they may not have the opportunity of having as good awareness of the shared practice of the community as the core members (e.g. they may be more active in distinct CoPs), and the necessary level of trust and value sharing is less likely to be reached. Moreover, apart from welcoming occasional members, the active group should also invite peripheral participation. Peripheral members usually cannot or do not want to exchange or share knowledge because they do not have sufficient time, competence (i.e. they are newcomers to that practice), or interest in the given practice (Wenger et al., 2002: 55-58). They will therefore frequently passively receive knowledge that is *transferred* one-way to them (Velencei et al., 2009: 203-205) from the more inner layers. However if the peripheral participation is 'legitimised' by the active group, then the committed peripheral members have the prospect of becoming full members of that community one day (Lave and Wenger, 1991). Lastly, the members who are gradually moving on in order to shift their engagement to some other social practices form the marginal group in a CoP.

While knowledge sharing, knowledge exchange, and knowledge transfer can occur at all CoP layers simultaneously, these layers are nonetheless defined by the types of learning most characteristic to them (Figure 5). We can now see that people who do not share knowledge cannot create their own social learning spaces (e.g. a CoP), but they can join the existing ones as occasional or peripheral members. While it is the active group and its core leaders that informally develop and lead the community, the prosperous communities open their knowledge boundaries for fresh perspective and thereby are touched on by various types of learning (Wenger et al., 2002).

Learning in networks and communities

Although Communities of Practice (CoPs) can strongly affect how practitioners work and interact with each other in an organisation, they do not necessarily reside completely within the formal organisational boundaries. CoP boundaries originate from peoples' shared histories of learning. The stronger the boundaries, the harder it becomes to cross them. For example it is impossible to fully understand a conversation of theoretical physicists if someone knows little about physics. The problem is not that it is the decision of physicist to exclude non-physicists from their interactions, but the fact that their shared practice draws the boundaries which may even take years of apprenticeship in that domain for someone to be able to cross them. In such sense boundaries of social learning spaces do not need to have negative connotations, for their presence is the proof that people are making sense of their learning (Weick, 1995a, Wenger, 2000). An interesting way of looking at these boundaries is by comparing communities with networks (which CoPs are both at the same time), a problem approached by Mintzberg (2012):

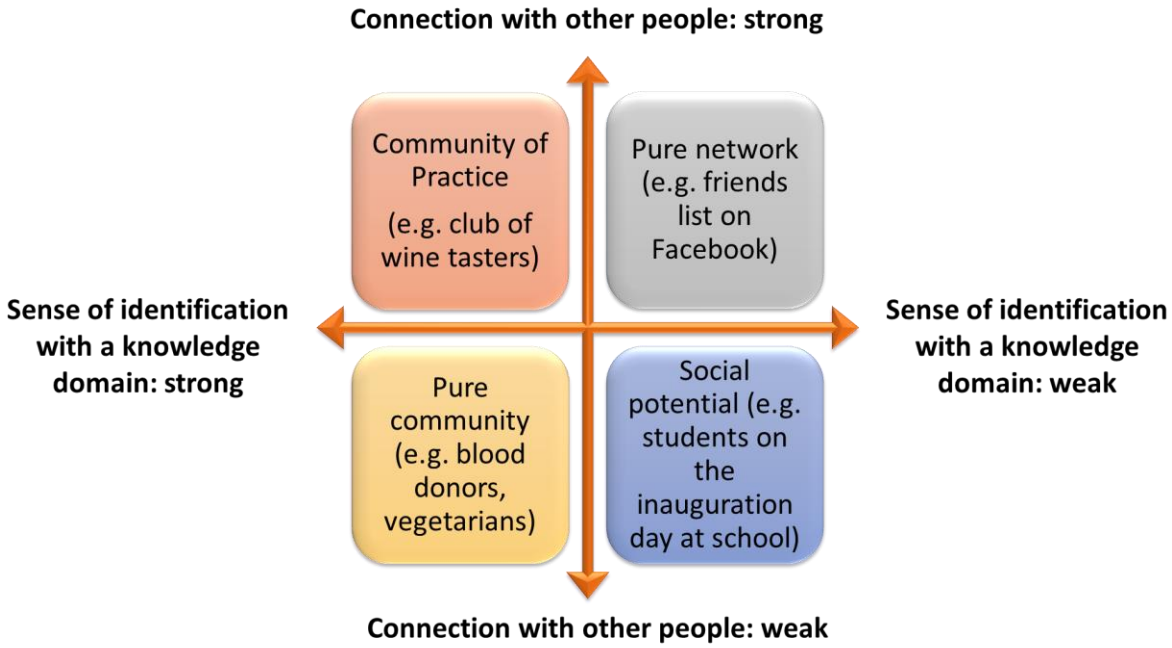
"Facebook is not community: Facebook is a network. If you want to find out the difference between a network and a community, ask your Facebook friends to paint your house. That is the difference between a network and a community (…). I think people are going to recognize and get tired of the fact that community (…) is a missing thing for a lot of people (…)"

Similarly Godin (2008) notes:

"There's two kinds of networking. There's a networking of giving your business cards to a lot of people, showing up at a lot of parties, friending many people on Facebook, counting how many people follow you on Twitter. That's worthless. It is worthless in the real world and it is worthless in the online world. The networking that matters is helping people achieve their goals reliably and repeatedly so that over time people have an interest in achieving your goals cause they have a stake in it."

What the two of the above accounts may help us realise is that networking and community building is not the same. Whereas networking is about establishing human connections, community building is about identifying oneself with a domain of knowledge, problem, or interest that is shared with other people (Wenger-Trayner and Wenger-Trayner, 2011b). We can then look at pure networks and pure communities as the extremes of one continuum, as well as consider the opportunities for building either or both in order to realise their social potential (Figure 6). Based on Godin and Mintzberg it can be argued that in today's world we are effective in using the technological tools for networking, but we tend to forget that the conviviality of a community does not necessarily follow. Likewise, as in Tsoukas' (2005c) metaphor of the 'Tyranny of Light', we are exposed to the wealth of pure network-based information, but at the same time we experience the scarcity of the fellowship of others with whom we could mutually identify ourselves as practitioners and negotiate the meaning of that information (Wenger and Wolf, 2003). In the times when the institution of identity is work rather than organisational affiliation (Handy, 1995), people must resort to "drawing out" and expressing themselves as practitioners by engaging with the world in the company of other knowers (Wenger and Kahan, 2004: 28). From this perspective the fuzzy boundaries of CoPs become perhaps the strongest sources of practitioners' stability: spaces where learning is intertwined with meaning and identity (Wenger et al., 2002, Wenger, 1998). And if we want to cultivate our social environments with these kinds of spaces, we need to augment our existing networks by distributing the leadership among those who are able to informally lead,

excite, and engage the others about their practice, as advocated by Mintzberg (2006, 2009b, 2009a) with his idea of 'communityship'.



Based on Wenger-Trayner and Wenger-Trayner (2011b).
Figure 6: Networks and communities.

A consequence of CoPs being simultaneously networks and communities is that their boundaries are both restricted and fostered by their members' webs of connections grounded in their identification with a shared knowledge domain (Wenger-Trayner and Wenger-Trayner, 2011b). As previously said, these boundaries signify learning, and the flowing knowledge is both sticky and leaky – it sticks to the local (the locus being the knowledge domain) social practices, but it also leaks through the organisational boundaries, in search of synergies with alike/akin external practices. An example of that would be a group of engineers working for the same company who develop their practice by sharing their knowledge with engineers in other organisations (Wenger et al., 2002, Wenger, 2010b). At the same time the key to effective CoPs is to balance learning at the core (i.e. within a narrow speciality) with learning happening at the boundaries with other practices (i.e. distinct specialities) – and it is on their very edges that the most exciting discoveries and synergies tend to happen (Wenger, 1998). This is why organisations more and more may need to appreciate boundary spanners who act as intermediaries and translators for members of CoPs organised around distinct practices, and who enable them working together and speaking in common language (Mørk et al., 2012, Levina and Vaast, 2005, Aldrich and Herker, 1977).

With regards to the above points it can then be suggested that while learning in CoPs usually happens within organisations, it concurrently flows across them i.e. it is learning that is both organisational and *trans-organisational*. Even when employees in organisations make task forces in (multi-professional) teams, they often share knowledge in widely networked communities overlapping these structures. In our view such organisational learning faces modern managers with both a challenge and an opportunity. On the one hand, we should accept that we can never fully predict and control how, when, by what means, and in which settings learning will stick to, and leak through the frontiers of our organisations. We may

therefore find ourselves in an urgent need of developing methods for fostering knowledge networks and communities, and aligning their negotiation of practice with the organisational strategy. On the other hand, this view of OL may perhaps help us in making a step forward towards thinking more intentionally about the ways learning naturally occurs between and within practitioners, as well as towards being increasingly aware of how we can maximize the use of its potential. Consequently trans-organisational learning does not have to sound as a threat, but rather as a new and exciting opportunity for understanding organisational knowledge systems in the fuller depth of their complexity.

Discussion: the 4I framework revisited

Learning in communities of practice has been portrayed in this attempt as a principally social and joint activity which strongly involves the notions of engagement with the world, verbalisation of perceived patterns, construction of identity, and co-generation of elusive knowledge-based boundaries (Wenger, 1998, Lave and Wenger, 1991, Polanyi, 1962, Weick, 1995a, Tsoukas, 2005b). Now we can explore the fit between social learning and the 4I framework and discuss whether any potential amendments could be suggested to the framework in order to improve it.

Starting at the individual level, the previously described framework distinguishes between two learning processes – intuiting (preverbal experiencing of 'patterns' and 'images') and interpreting (articulating 'patterns' and constructing 'cognitive maps'). These processes principally seem to be sufficiently coherent with how the negotiation of meanings in CoPs has been described here, i.e. as experiencing the world through 'participating', and by giving substance to experiences (i.e. 'reificating') which in turn influences the subsequent participation. Nonetheless, there exists a continuous interplay between peoples' experiencing of the world and how they attribute the words to their experiences (Wenger, 1998). It can then be argued that thoughts lead to language and mental models as much as language and mental models lead to thoughts, i.e. learning processes at the individual level are not sequential, as in the 4I framework, but they rather continuously inform each other. We could see this in Polanyi's (1962: 106) example of the medical student who had "entered a new world": as soon as she had learned the necessary language of radiology, she was able to see the X-ray pictures in more complex ways than people outside of that practice. Interestingly, Polanyi (1962) notes that once someone has learnt the words to see the world differently, then no longer do they need the words which have taken them there because they will not lose the gained ability even if they forget those words. What this shows us is that language and thought are fluid and the borders between them are as difficult to grasp in terms of the difference between the explicit and the tacit dimension of human knowledge (Polányi, 1966b). To represent this, it can be argued that intuiting and interpreting processes at the individual level of the 4I framework might be forming a loop instead of being positioned in a sequence (Figure 7), even if "the 4I's have been presented in a linear fashion for ease of explanation" (Crossan et al., 1999: 530). Based on the above arguments it can be argued that the simplicity in this particular case may perhaps be misleading.

Level of analysis	Learning process(es)
Individual	intuiting, interpreting
Group	interpreting, integrating
Organisational	institutionalising
Trans-organisational	**re-interpreting, dis-and re-integrating, de-institutionalising**

Figure 7: The 4I revisited (the suggested elements are in bold letters)

Most of the above argument has been dedicated to the phenomenon of knowledge sharing, which has been described as mutual learning that is strongly grounded in identity and which leads to the development of social learning spaces. Without knowledge sharing no social learning space could ever exist, because knowledge sharing gives social learning spaces their very substance. However, as it has been shown, knowledge sticks to the practice and therefore leaks through the organisational boundaries as the knowledge sharing process happens between likeminded professionals, i.e. we get CoPs that are trans-organisational. Therefore, we suggest introducing a fourth level of analysis which appears to be essential for the framework in the context of this discussion – the *trans-organisational* level (Figure 7). The trans-organisational level is where learning 'leaks' beyond the organisation via the networked communities of knowers who identify themselves with a shared knowledge domain that they all care about. The reason for considering this level of analysis is that practitioners are often more likely to learn from and with alike practitioners outside of their organisations (i.e. knowledge 'sticks' to their practice) than from their colleagues in neighbouring departments. As the trans-organisational level signifies knowledge sharing that may involve multiple organisations, the processes which can occur at this level are different from the ones above. Instead of interpreting, we can talk about reinterpreting, which signifies the constantly changing and constantly renegotiated meaning of the concepts of the discipline. Integrating will partly turn into its opposite, i.e. knowledge becomes disintegrated and then reintegrated again, depending on the continuous reinterpretations in line with how the disciplinary knowledge is evolving; this recognises the ongoing interactions and agreements of coordinated action among practitioners from different organisations. As knowledge sharing thus transgresses the organisational boundaries, knowledge is deinstitutionalised. We can often see this with specialists at particularly high levels of expertise, who are much more loyal to their discipline that to the organisations they work for. This also gives CoPs non-negligible power which enables them exercising formalised roles affecting the organisational context.

The trans-organisational level is listed next after the organisational level, because knowledge can flow through the networks of mutually engaged practitioners before (if ever) it is institutionalised in the organisational context. Such learning may lead to strategic renewal,

but strategic not in the sense of the strategy being formulated 'at the top' of organisations, but as the strategy developed 'without design' – through the actions of people at all organisational levels (Chia, 2009). Renewing of organisations through learning is therefore not only about 'how much learning' or about 'how systematically the new learning is embedded in the routines and regulations'; but it should also encourage such questions as 'how deep learning' and 'how far reaching learning' of members of social learning spaces is taking place and this knowledge sharing irrevocably reconstructs the character of organisations.

Conclusion

Knowledge sharing in organisations has been portrayed in this paper as fundamentally social, and by large happening within informal networked communities of practitioners. In this view social practices are developed both locally and globally: in one team or department, across multinational and trans-organisational communities of experts, and often in both of these at the same time. Indeed, we all experience such knowledge sharing on daily basis. This happens when we talk to our colleagues whom we see at work, or when we purposefully seek, connect, and engage with the practitioners who belong 'to the same tribe' and who can enrich our ways of working and thinking and learning. By looking at the world of organisations this way, we can see that to think of OL only in the organisational or inter-organisational context is too limiting. Just as we cannot predict how the nodes of human networks continuously break apart only to be reborn in new constellations, we also cannot imagine the array of partnerships and communities that already exist or that are potent to come into place disregarding the traditional organisational boundaries. This suggests that learning within a single organisation does not happen *in spite* of trans-organisational learning, but rather OL actually comes to life due to practitioners spontaneously forming networks and communities of people who care about the similar topics and problems in their respective disciplines. Therefore, based on synthesising the literature from the broad area of knowledge and learning in organisations we suggest extending the 4I framework by adding another layer beyond the organisational one, the trans-organisational. By doing so, we can achieve a rejuvenation of the 4I framework to incorporate social learning spaces in general and communities of practice in particular.

Our primary intention with this paper is to engage in debates about the highly complex social aspects of situated learning and provide an improved framework for academics pursuing their research in any area of OL or communities of practice, which would be sufficiently broad and robust to allow for a more realistic picture of knowledge sharing. However, we also see our work to be relevant for practicing managers in the area of OL who want to foster communities of practice in their organisations and encourage employees engaging in various social learning practices. At the current stage, this inquiry is conceptual, although it was informed by practice; further empirical projects are expected not only to illustrate the validity of the argument but also further refine this framework.

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